

Validation of humidex in evaluating heat stress in the outdoor jobs in arid and semi-arid climates of Iran

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Abstract

Introduction: Regarding development of several thermal indices and limitations of each, in this research applicability and validity of temperature- humidity index (Humidex) were examined against the standard heat index, Wet Bulb Globe Temperature -WBGT, as well as tympanic temperature of subjects.

Material and Method: This cross-sectional study was done on 163 subjects at spring and summer (2013) in outdoor jobs of arid and semi-arid climates of Iran. Environmental parameters as well as tympanic temperature of subjects were measured simultaneously and then heat indices were determined. Data were analyzed using linear correlation charts and Kappa coefficient of agreement by means of SPSS software version 20.

Result: A strong correlation was obtained between WBGT and Humidex in both arid and semi-arid regions ($r > 0.98$), while the correlation between Humidex and tympanic temperature was moderate ($r = 0.5-0.8$). Based on the obtained Kappa value, the agreement coefficient between Humidex and WBGT was 0.878. This value was obtained equal to 0.226 for the Humidex and tympanic temperature.

Conclusion: The results of this study showed that Humidex can be applied as an appropriate substitute for the WBGT index. However, if evaluation of environmental condition with low air temperature or very hot situation is considered, relying only on the Humidex results will not provide a realistic estimation of thermal strain imposed to individuals.

Key words: *Arid and Semi-Arid Regions, Heat Stress, Humidex, Outdoor Jobs, Validation, WBGT*

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